Designing and Implementing a Clinician Workstation

Thomas G. Tape MD, James R. Campbell MD

Department of Internal Medicine
University of Nebraska Medical Center
600 South 42nd Street
Omaha, NE; 68198-3331

We describe a simple approach to designing and quickly implememting a clinician workstation that helps practitioners access a variety of information resources. Using easy-to-use graphical tools, we installed a pilot workstation in our clinics. We were able to accommodate most of our users' needs and have a functional workstation installed in two months. This is the first step of an evolutionary process moving from separate tasks to full application integration.

The expanding number of clinical information systems and computer-based information resources has taxed the ability of clinicians to master and utilize them. We sought to design a clinician workstation that could be rapidly implemented and that would facilitate access to patient care and knowledge-based systems and integrate information across resources. The project goals were to educate the clinical staff regarding existing and planned information resources, to better understand their information needs, and to develop a pilot workstation meeting most of these needs.

Our computing environment consists of multiple clinical and knowledge retrieval systems linked by a campus-wide token ring backbone. The principle clinical systems are an inpatient HIS, the COSTAR® ambulatory records system, a laboratory system, and several on-line knowledge sources. To design a workstation to integrate these systems, we met with focus groups of physicians and nurses in the Department of Internal Medicine. Although the focus groups generated considerable discussion, there was no uniform consensus across groups as to which features were important. Each group tended to identify needs specific to their job. The workstation project group agreed on several operating principles (e.g. Windows® platform, task oriented displays, single mouse click to change tasks, seamless access to information without multiple layers of menus).

We developed and implemented a pilot workstation in the internal medicine clinics. We used Asymetrix Toolbook® as the development tool because of local expertise in the product and its relative simplicity. One clinician (with no programmer assistance) developed the pilot workstation during two months. The goal of the pilot workstation was to solve the most pressing access needs and at a minimum provide seamless access to all campus systems. It functions as an application manager within the Windows® environment. Users select the desired application from a button bar displayed at the bottom of the screen. The workstation then finds the application window and displays it in a window that fills the screen except for the button bar.

The display minimizes clutter by focusing the user's attention on the active application while always making it obvious how to access other available applications. There are no drop down menus or overlapped windows. A user either works in the active application window or clicks on an application listed on the workstation button bar visible at the bottom of the screen. The workstation checks whether applications are already running before launching new instances to avoid duplicate sessions. When the user selects an application that connects to a remote computer, the workstation checks to be sure the previous session has not timed out and re-establishes the connection as needed. Each workstation may be configured to access up to 19 applications through a user-friendly setup utility which specifies the function of each of the buttons on the button bar.

We have described our approach to designing and implementing a clinician workstation for accessing patient data and information resources. We view workstation development as an evolutionary process starting with independent applications accessible from a single device and moving towards true application integration. The pilot workstation takes an important first step by presenting users with an intuitive and seamless front end to a variety of information resources.

The workstation group is investigating technology to achieve a number of future goals including an integrated security system, task-specific views of data across multiple systems, tighter linkages of clinical systems to knowledge bases, and voice technology. How to achieve these ambitious goals in a realistic time frame is the focus of our current research. Clinician enthusiasm for use and support of computer resources will depend on whether the promises of better organization and access to data are actually realized.